Sept. 11, 1928. 1,684,204

S. RUTTENBERG

METHOD OF CONSTRUCTING BALLAST RESISTANCES

Filed May 3, 1926

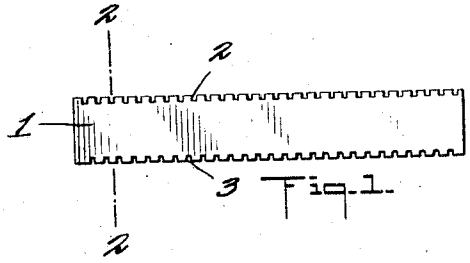


Fig. 1.

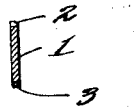


Fig. 2.

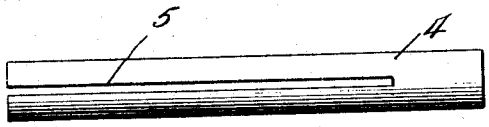


Fig. 3.

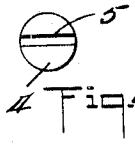


Fig. 4.

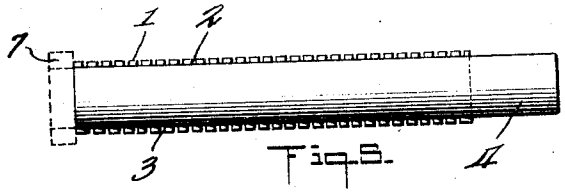


Fig. 5.

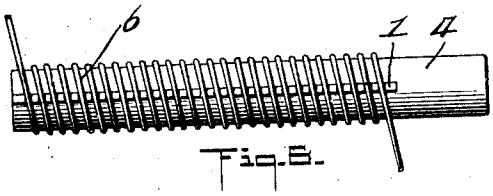


Fig. 6.

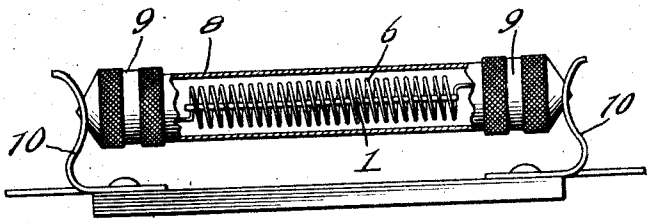


Fig. 7.

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UNITED STATES PATENT OFFICE.

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METHOD OF CONSTRUCTING BALLAST RESISTANCES.

Application filed May 3, 1926. Serial No. 106,291.

This invention relates to a method of winding wire or the like for use as electrical resistances.

In endeavoring to obviate the necessity of using batteries in connection with wireless receiving sets, it has been proposed to connect the set through suitable means to the electric current mains. One objection to such an arrangement, however, especially in country districts, is that the voltage of the supply mains is liable to vary to quite an appreciable extent. It is necessary, of course, if the apparatus is to operate successfully, that the impressed voltage be maintained substantially constant, and in order to obtain such a constant voltage, it has been proposed to use resistances in the input circuit which will vary in value according to the strength of the current flowing therethrough in such a manner as to give a substantially uniform voltage at the terminals thereof.

Such resistances, referred to in the art as ballast resistances, though they are intended for heavy duty, should be constructed so that they fill as small a space as possible, and so that there will be no liability of short-circuiting taking place between various parts thereof.

One of the objects of the present invention is to provide a method of winding such resistances on a form in an expeditious manner.

A further object of the invention is to provide a method of winding resistances in spiral form by which the diameter of the outer peripheral surface thereof is made uniform and the different spirals thereof separated from each other by definite amounts.

A further object of the invention is to provide a method of winding ballast resistances which are especially adapted for making up in cartridge form, i. e. in tubes of cylindrical form having contacts at the two ends.

According to this invention, the resistance wire or the like is wound upon a form made of insulating material, and of a substantially flat formation, by enclosing the body of such form within a core or the like, with the edges of such form extending beyond the surface of such core, and winding the resistance wire or the like on said core in serrations or slots within the projecting edges of such form.

In order that the invention may be clearly understood, reference is made to the accompanying drawing, which illustrates by way of example an embodiment of this invention, and in which:—

Figure 1 is a plan view of a form used according to this invention;

Figure 2 is a sectional elevation thereof taken on line II—II;

Figures 3 and 4 are respectively a plan view and an end elevation of a core used according to this invention;

Figure 5 is a plan view of the core having the form placed in position therein and ready for winding the resistance wire or the like thereon;

Figure 6 is a front elevation of the core and form shown in Figure 5, having the resistance wire wound thereon;

Figure 7 shows a resistance made according to this invention, assembled in cartridge form.

The form 1 is made of any suitable insulating material, but preferably of mica, and is preferably of flat formation, as shown in Figure 2 of the drawing. Such formation, however, is not essential, but, if desired, it may be of narrow elliptical form or other suitable shape.

The two side edges of the form, as is clearly shown in Figure 1 of the drawing, are serrated, being respectively provided with series of slots 2 and 3, the slots in one edge being preferably offset with respect to those in the other edge.

The core about which the resistance wire is to be wound may be of metal, wood, or other suitable material, and comprises a member 4 of a length somewhat greater than the form 1, and of a cross-section depending upon the shape into which it is desired to wind the resistance.

The resistances preferably are wound into a cylindrical form, and in such case the cross-section of the core will be circular. Extending longitudinally of the core, from one end thereof, and to a distance slightly greater than the length of the form 1, is a slot 5, as shown in Figures 3 and 4 of the drawing. The slot is of a shape adapted to receive the form 1, and in the embodiment illustrated is of rectangular form, as shown

in Figure 4 of the drawing. The diameter of the core in the direction of the slot 5 is substantially equal to the distance between the bases of the two rows of slots 2 and 3 in the form, so that, when the form is placed in position within the core, the edges of the form will project beyond the sides of the core distances equal substantially to the depth of the slots therein.

The wire to be used for the resistance may be of iron or other suitable material, having a fairly high temperature coefficient of resistance.

After the form is placed in position within the core, with the serrated edges projecting therefrom, the wire is wound around the core, as shown in Figure 6 of the drawing, being passed through the slots in such projecting edges. Thus, if the core 4 is of circular cross-section, the wire will form a resistance 6 of spiral form, with all the coils of the same diameter, and spaced apart equal distances.

In order to facilitate the removal of the wound wire and the form 1 from the core, the core is preferably slightly tapered, the tapering being towards the open end of the slot 5. Also, in order to prevent the two halves of the core being caused to grip the form too tightly during the winding operation, the spaced portions of the core at the end thereof may be held in proper spaced relation by means of a member 7 (as shown in dotted lines in Fig. 5) which is of a thickness slightly greater than that of the form, and which may be placed within the open end of the slot 5 after the introduction therein of the form 1. Such member 7 may, if desired, be integral with one or other half of the core, and, in order to facilitate the introduction of the form within the core, one or other of such halves of the core may be hinged or pivoted at its rear end to the body of the core.

When removed from the core, the coils of the resistance 6 will be maintained in the desired spaced relation by means of the form 1, in the slots of which such resistance is wound. The distance apart of these slots will, of course, determine the distance between the adjacent coils of the resistance. A suitable distance between the slots is from $\frac{1}{16}$ to $\frac{3}{32}$ of an inch, and the depth of such slots is preferably greater than the diameter of wire to be wound therein.

The resistance, after being wound on the insulating form, may be mounted in any suitable manner, preferably being introduced into a bulb containing hydrogen or other inert gas, and its opposite ends connected to two terminals. A preferred form of tube for supporting the resistance is illustrated in Figure 7 of the drawing, this tube being of cylindrical form, and having terminals 9 at the opposite ends thereof, to which the ends of the coiled resistance are attached.

The central portion of the tube 8 between the terminals 9 is preferably of glass, and the terminals 9 are in the form of caps covering the open ends of such tube. The internal diameter of the tube is very slightly greater than the width of the form, so that the form with the resistance wound thereon may be introduced therein; such form, being of insulating material, may rest against the inner surface of the tube, and since the slots in the side edges of the form are of greater depth than the diameter of the resistance wire, such wire will be spaced apart from the inner surface of the tube. The advantage of a tube of this form is that it takes up a minimum of space, and that it can be readily mounted by placing it in position between two spring terminals 10—10.

The form and core described in this specification are described by way of example only, and it is obvious, of course, that these may vary both as to shape and as to material without departing from the spirit and scope of the invention, as defined in the accompanying claims.

I claim:—

1. The method of winding resistance wire on a form of substantially flat shape having serrated edges with the coils of said wire supported in said serrations, but otherwise spaced from the form, which consists in supporting said form within a core with its serrated edges projecting from the sides thereof, and winding said wire on said core between the serrations on the side edges of the form.

2. The method of winding resistance wire on a form of substantially flat shape having serrated edges with the coils of said wire supported in said serrations, but otherwise spaced from the form, which consists in supporting said form within a longitudinally extending slot within said core, with its serrated edges projecting from the sides thereof, and winding said wire on said core between the serrations on the side edges of the form.

3. The method of winding resistance wire on a form of substantially flat shape having serrated edges with the coils of said wire supported in said serrations, but otherwise spaced from the form, which consists in supporting said form within a core of the shape of the resistance which it is desired to wind, with its serrated edges projecting from the sides thereof, and winding said wire on said core between the serrations on the side edges of the form.

4. The method of winding resistance wire on a form of substantially flat shape having serrated edges with the coils of said wire supported in said serrations, but otherwise spaced from the form, which consists in sup-

porting said form within a core slightly tapered towards one end, with the serrated edges of the form projecting from the sides of the core, and winding said wire on said core between the serrations on the side edges of the form.

5. The method of winding resistance wire on a form of substantially flat shape having series of slots in the side edges thereof respectively, which consists in supporting said form within a core with its edges projecting from the sides thereof distances substantially equal to the depth of the slots, and winding said wire on said core within said slots on the side edges of the form.

In testimony whereof I affix my signature.

SAMUEL RUTTENBERG.